

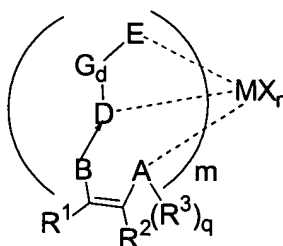
### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

**Claims 1-11 (canceled)**

**Claim 12 (currently amended):** A catalytic system for olefin polymerization or copolymerization comprising a catalyst having the following formula:



wherein:

A, B,D, E, G, and connecting bonds comprise a tridentate ligand; and wherein

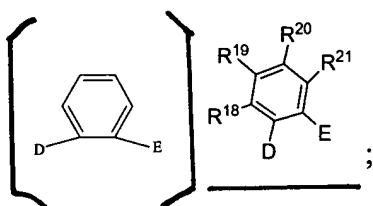
A represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, a selenium atom-containing moiety, a nitrogen atom-containing moiety, and a phosphorus atom-containing moiety;

B represents a chemically inert moiety selected from the group consisting of a nitrogen atom-containing moiety, a phosphorus atom-containing moiety, and a substituted or unsubstituted hydrocarbyl moiety;

D represents O, S, Se, or a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a nitrogen atom-containing moiety, a sulfur atom-containing moiety, and a selenium atom-containing moiety;

E represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, a selenium atom-containing moiety, a nitrogen atom-containing moiety, and a phosphorus atom-containing moiety;

G represents a chemically inert substituted or unsubstituted phenylene group bridging D and E through



$R^1$ ,  $R^2$ , and  $R^3$  each individually represents hydrogen or a chemically inert substituted or unsubstituted hydrocarbyl moiety,  $R^1$  and  $R^2$  being optionally linked to form a ring;

**$R^{18}$ ,  $R^{19}$ ,  $R^{20}$ ,  $R^{21}$  each independently represents hydrogen, halogen, a chemically inert substituted or unsubstituted hydrocarbyl moiety;**

M represents a transition metal selected from group 3 to group 11, M being linked to each of A, D, and E by a covalent or a coordinate covalent bond;

X represents a weakly coordinating monovalent ligand;

d is 1;

q is 0 or 1;

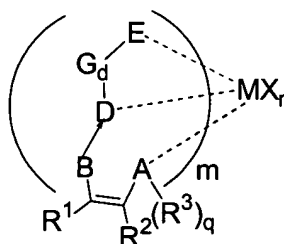
m is 1, 2 or 3; and

n is 1, 2, 3 or 4 as needed to balance the charge on M.

**Claim 13 (previously presented):** The catalytic system as recited in claim 12,

wherein A is selected from the group consisting of O, S, sulfinyl, sulfonyl, Se,  $\text{NR}^{22}$ ,  $\text{NR}^{23}\text{R}^{24}$ ,  $\text{N}(\text{O})\text{R}^{25}\text{R}^{26}$ ,  $\text{PR}^{27}$ ,  $\text{PR}^{28}\text{R}^{29}$ ,  $\text{P}(\text{O})\text{R}^{30}\text{R}^{31}$ , and  $\text{Se}(\text{O})\text{R}^{39}$ , wherein  $\text{R}^{22}$ ,  $\text{R}^{23}$ ,  $\text{R}^{24}$ ,  $\text{R}^{25}$ ,  $\text{R}^{26}$ ,  $\text{R}^{27}$ ,  $\text{R}^{28}$ ,  $\text{R}^{29}$ ,  $\text{R}^{30}$ ,  $\text{R}^{31}$ , and  $\text{R}^{39}$  each individually represents hydrogen, halogen, or a substituted or unsubstituted hydrocarbyl group.

**Claim 14 (currently amended):** A catalytic system for olefin polymerization or copolymerization comprising a catalyst having the following formula:



wherein:

A, B, D, E, G, and connecting bonds comprise a tridentate ligand; and wherein

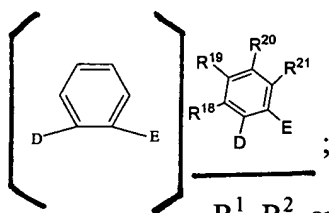
A represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, a selenium atom-containing moiety, a nitrogen atom-containing moiety, and a phosphorus atom-containing moiety;

B represents a chemically inert moiety selected from the group consisting of a nitrogen atom-containing moiety and a substituted or unsubstituted hydrocarbyl moiety;

D is a nitrogen atom or NR<sup>5</sup>;

E represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, a selenium atom-containing moiety, a nitrogen atom-containing moiety, and a phosphorus atom-containing moiety;

G represents a chemically inert substituted or unsubstituted phenylene group bridging D and E through



$R^1$ ,  $R^2$ , and  $R^3$  each individually represents hydrogen or a chemically inert substituted or unsubstituted hydrocarbyl moiety,  $R^1$  and  $R^2$  being optionally linked to form a ring;

**R<sup>5</sup> represents a lone pair nitrogen atom electron, hydrogen, or a metal-coordinating moiety containing an oxygen atom, a sulfur atom, a selenium atom, or a phosphorus atom;**

**R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> each independently represents hydrogen, halogen, a chemically inert substituted or unsubstituted hydrocarbyl moiety;**

M represents a transition metal selected from group IV, M being linked to each of A, D, and E by a covalent or a coordinate covalent bond;

X represents a weakly coordinating monovalent ligand;

d is 1;

q is 0 or 1;

m is 1; and

n is 2, 3 or 4 as needed to balance the charge on M.

**Claim 15 (previously presented):** The catalytic system as recited in claim 12,

wherein E is selected from the group consisting of O, S, sulfinyl, sulfonyl, Se,  $\begin{smallmatrix} \diagup \\ \text{NR}^{22} \\ \diagdown \end{smallmatrix}$ , —  
 $\text{NR}^{23}\text{R}^{24}$ , —N(O)R<sup>25</sup>R<sup>26</sup>,  $\begin{smallmatrix} \diagup \\ \text{PR}^{27} \\ \diagdown \end{smallmatrix}$ , —PR<sup>28</sup>R<sup>29</sup>, —P(O)R<sup>30</sup>R<sup>31</sup>, and —Se(O)R<sup>39</sup>, wherein R<sup>22</sup>,  
R<sup>23</sup>, R<sup>24</sup>, R<sup>25</sup>, R<sup>26</sup>, R<sup>27</sup>, R<sup>28</sup>, R<sup>29</sup>, R<sup>30</sup>, R<sup>31</sup>, and R<sup>39</sup> each individually represents hydrogen,  
halogen, or a substituted or unsubstituted hydrocarbyl group.

**Claim 16 (previously presented):** The catalytic system as recited in claim 12,

wherein B is a chemically inert substituted or unsubstituted hydrocarbyl moiety.

**Claim 17 (previously presented):** The catalytic system as recited in claim 12,

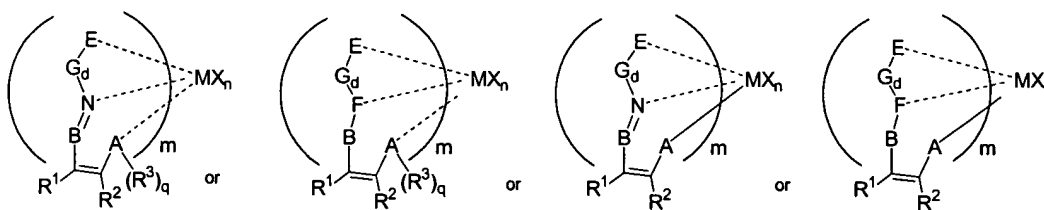
wherein M is selected from the group consisting of Ti (IV), Zr (IV), Hf (IV), Cr (III), Fe (III), Fe (II), Ni (II), Pd (II), and Co(II).

**Claim 18 (previously presented):** The catalytic system as recited in claim 17,

wherein M is Ti (IV) or Zr (IV).

**Claim 19 (previously presented):** The catalytic system as recited in claim 12, wherein X is selected from the group consisting of F, Cl, Br, I, nitrogen atom-containing moiety, boron atom-containing moiety, and oxygen atom-containing moiety.

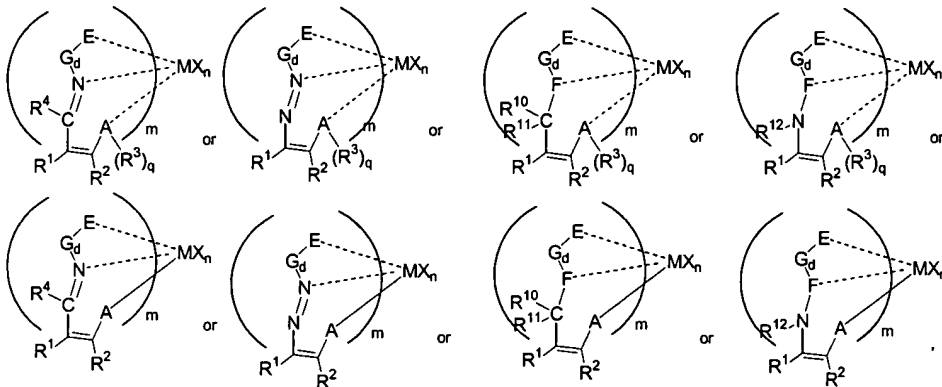
**Claim 20 (previously presented):** The catalytic system as recited in claim 12, wherein the catalyst has the following formula:



wherein

F represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, and a selenium atom-containing moiety.

**Claim 21 (previously presented):** The catalytic system as recited in claim 20, wherein the catalyst has the following formula:

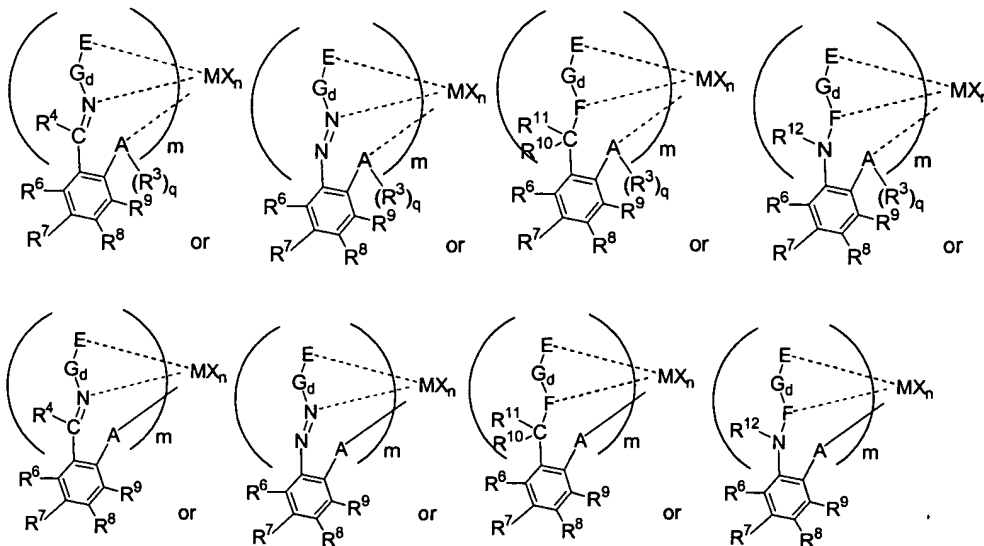


wherein:

$R^4$ ,  $R^{10}$ , and  $R^{11}$  each individually represents hydrogen or a chemically inert substituted or unsubstituted hydrocarbyl moiety,  $R^{10}$  and  $R^{11}$  being optionally linked to form a ring; and

$R^{12}$  represents hydrogen or a chemically inert substituted or unsubstituted hydrocarbyl moiety.

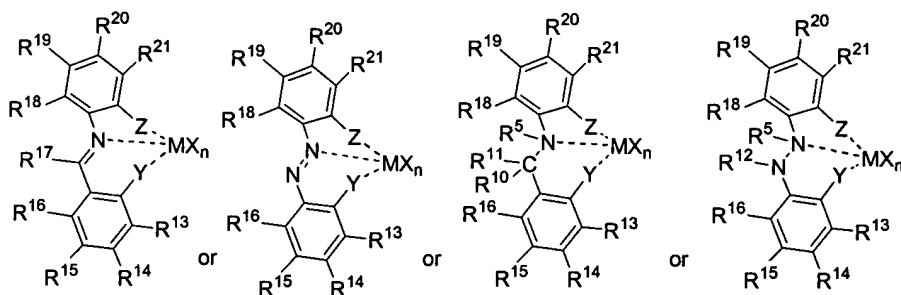
**Claim 22 (previously presented):** The catalytic system as recited in claim 20, wherein the catalyst has the following formula:



wherein:

$R^6, R^7, R^8, R^9$  each independently hydrogen, halogen, a chemically inert substituted or unsubstituted hydrocarbyl moiety, or a chemically inert functional group; any two adjacent  $R^6, R^7, R^8, R^9$  moieties being optionally linked to form a ring.

**Claim 23 (previously presented):** A catalytic system for olefin polymerization or copolymerization comprising a catalyst having the following formula:



wherein:

$R^{10}, R^{11}, R^{12}$ , and  $R^{17}$  each individually represents hydrogen, halogen, substituted hydrocarbyl moiety, or a chemically inert function group,  $R^{10}$  and  $R^{11}$  being optionally linked to form a ring;

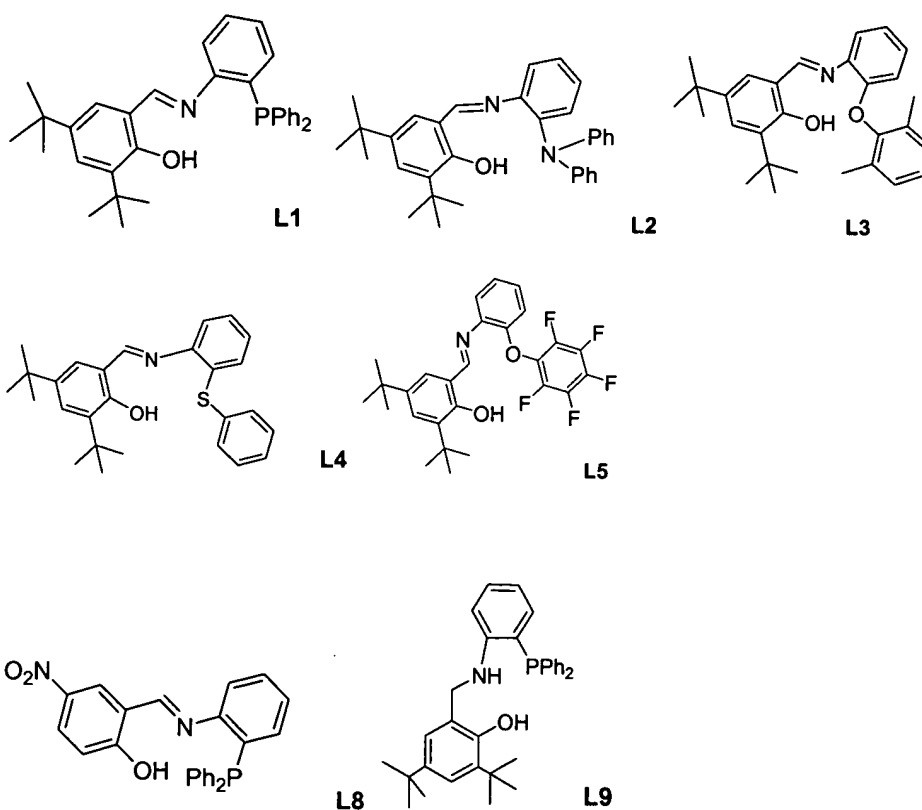
$R^{13}, R^{14}, R^{15}, R^{16}, R^{18}, R^{19}, R^{20}, R^{21}$  each independently represents hydrogen, halogen, a chemically inert substituted or unsubstituted hydrocarbyl moiety, or a chemically inert functional group; any two adjacent  $R^{13}, R^{14}, R^{15}, R^{16}, R^{18}, R^{19}, R^{20}, R^{21}$  moieties being optionally linked to form a ring;

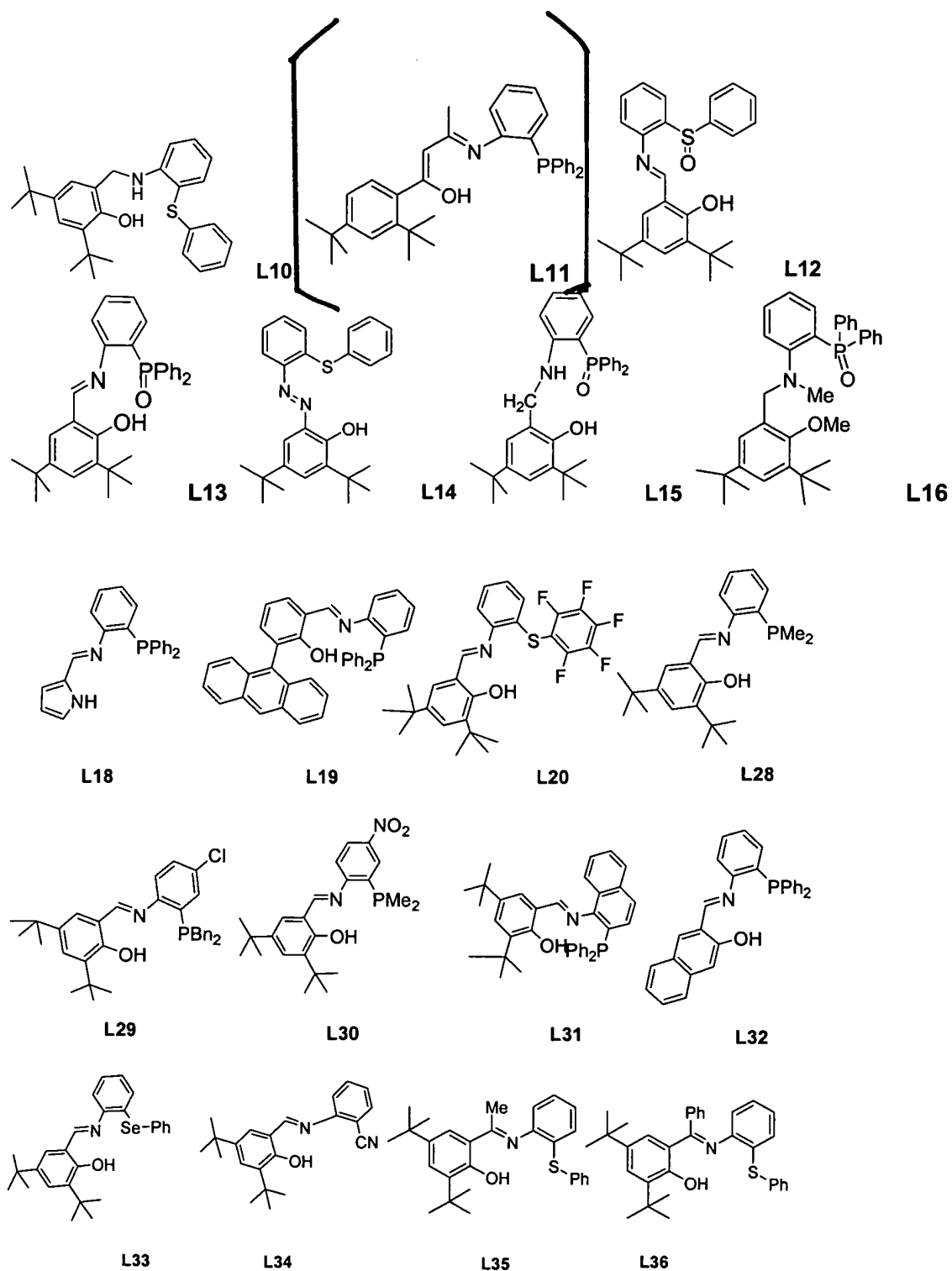
$R^5$  represents a lone pair nitrogen atom electron, hydrogen, or a metal-coordinating moiety containing an oxygen atom, a sulfur atom, a selenium atom, or a phosphorus atom; and

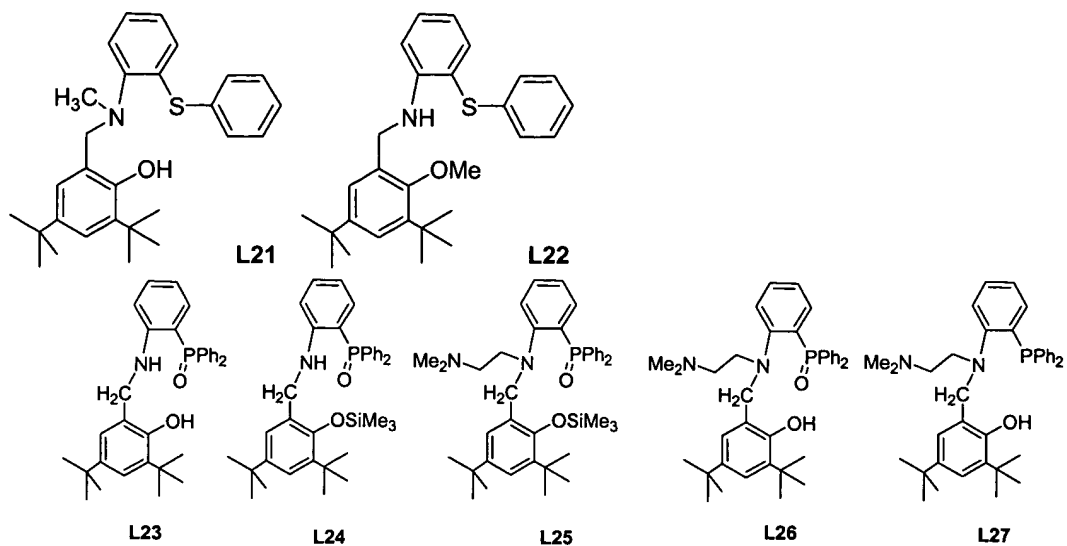


Y and Z each independently represents a metal-coordinating moiety selected from the group consisting of an oxygen atom-containing moiety, a sulfur atom-containing moiety, a selenium atom-containing moiety, a nitrogen atom-containing moiety, and a phosphorus atom-containing moiety.

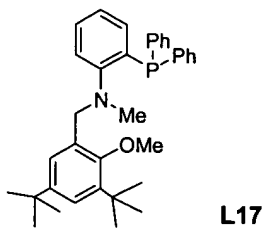
**Claim 24 (currently amended):** The catalytic system as recited in claim 12, wherein said tridentate ligand is prepared from a ligand selected from the group consisting of



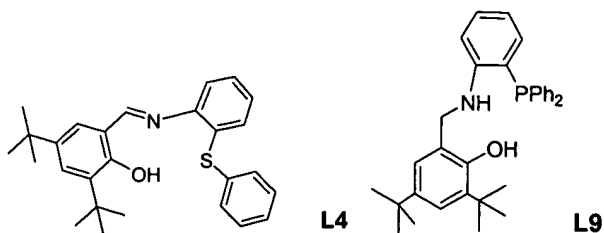
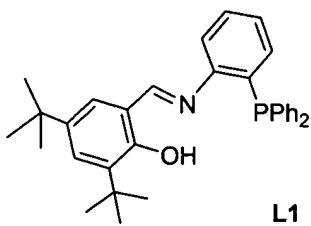


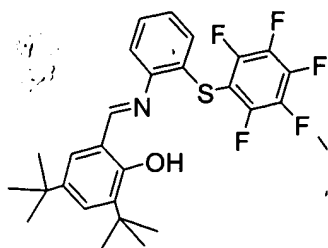


and

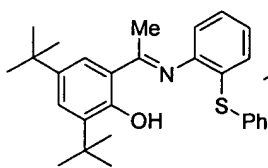


**Claim 25 (previously presented):** The catalytic system as recited in claim 24,  
wherein said tridentate ligand is prepared from a ligand that is

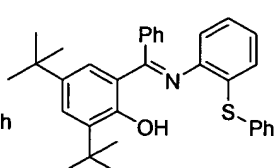




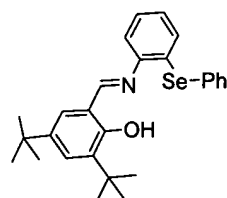
**L20**



**L35**



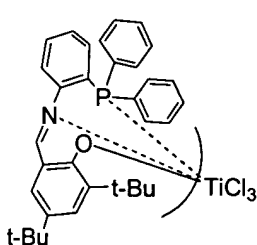
**L36**



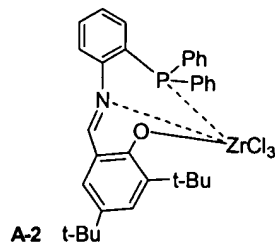
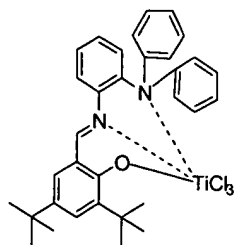
**L33**

or

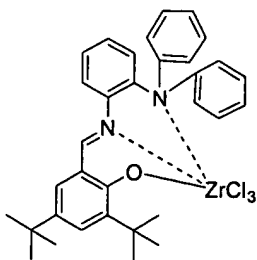
**Claim 26 (currently amended):** The catalytic system as recited in claim 12,  
wherein said catalyst is selected from the group consisting of



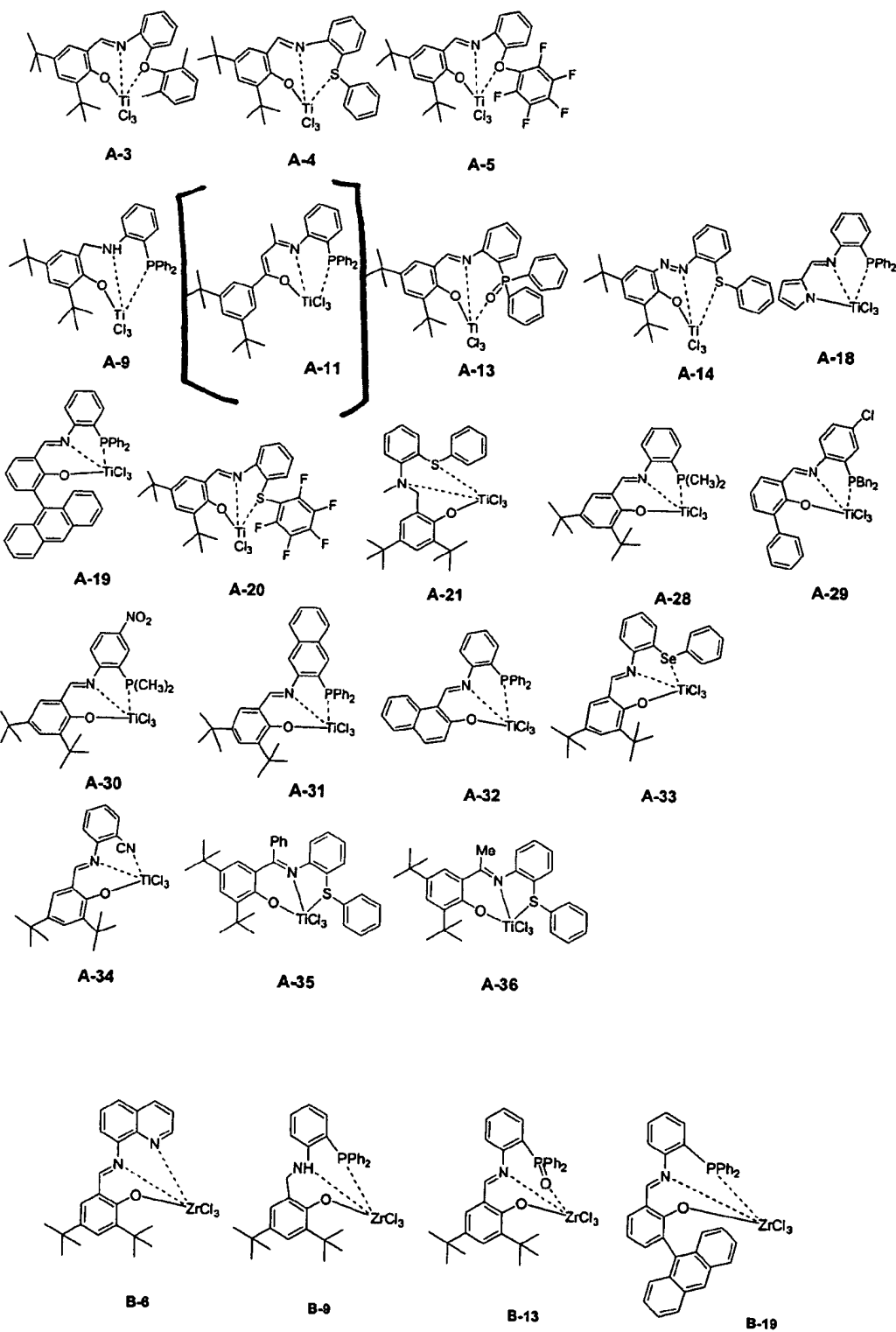
**A-1**

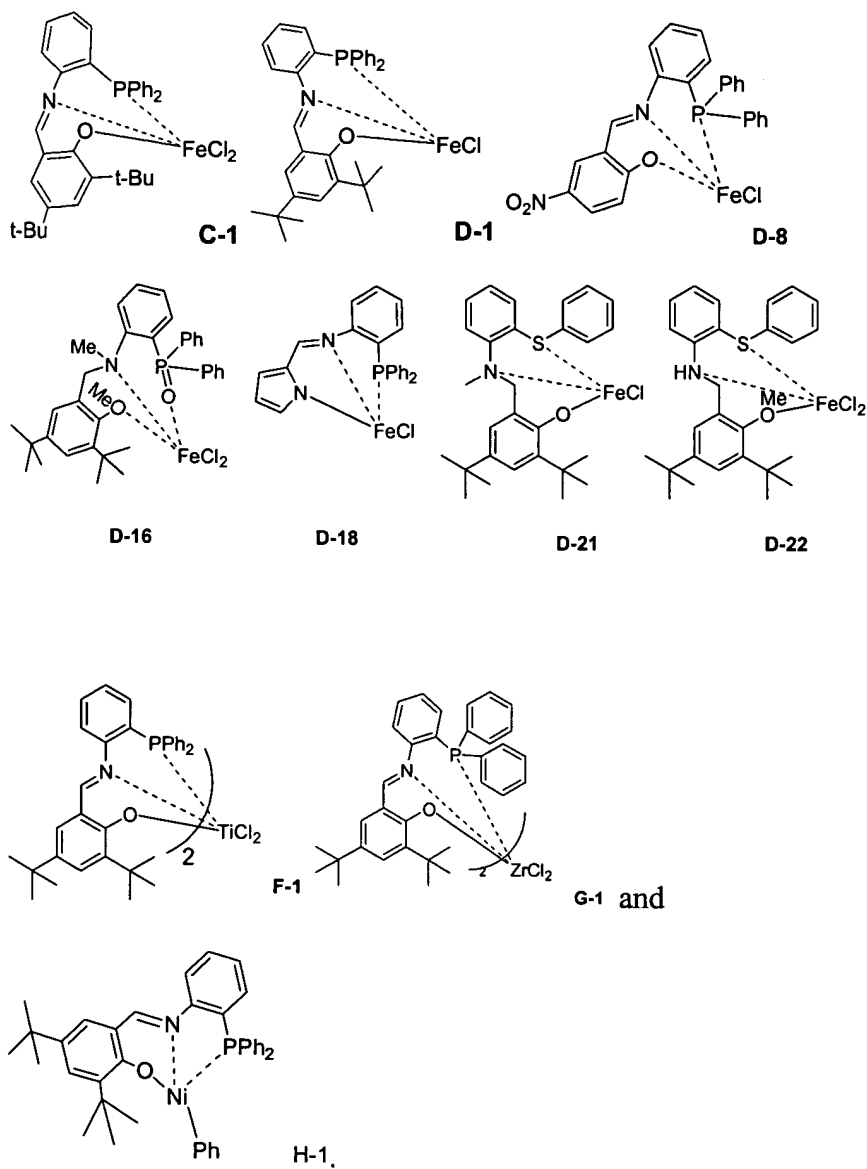


**B-1**

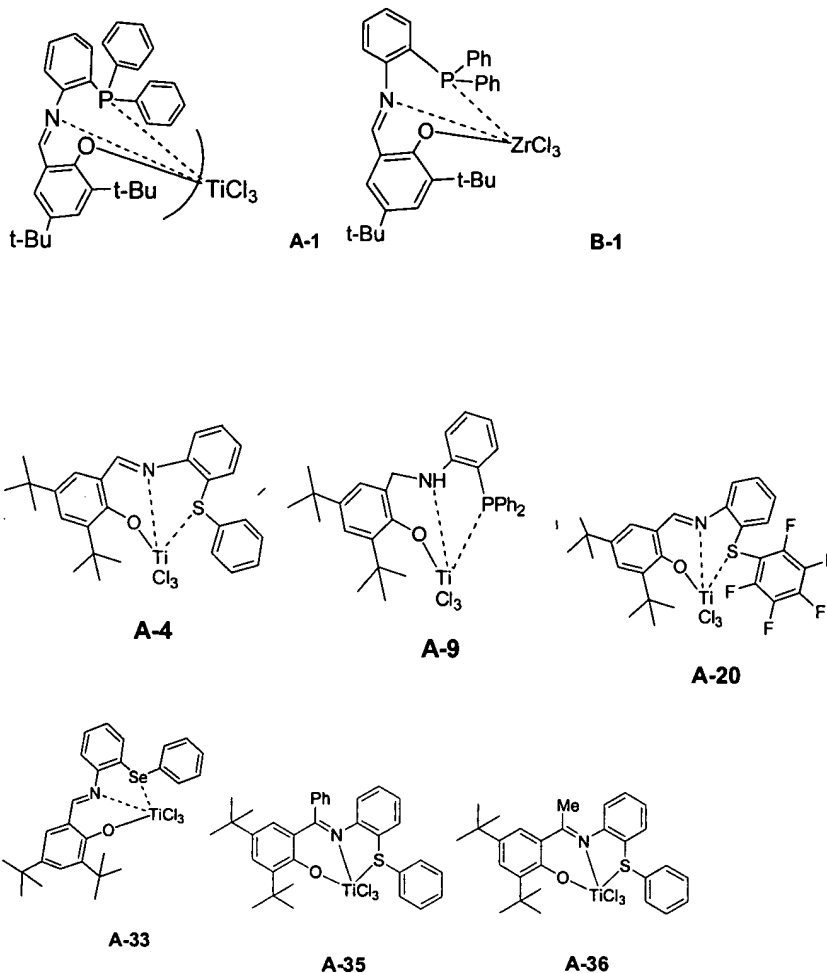


**B-2**





**Claim 27 (previously presented):** The catalytic system as recited in claim 26,  
wherein said catalyst is



**Claim 28 (previously presented):** The catalytic system as recited in claim 12, wherein the catalyst is a homogeneous catalyst or a heterogeneous catalyst.

**Claim 29 (previously presented):** The catalytic system as recited in claim 12, further comprising a solid support.

**Claim 30 (previously presented):** The catalytic system as recited in claim 29, wherein said solid support is an organic polymeric material or an inorganic material.

**Claim 31 (previously presented):** The catalytic system as recited in claim 30, wherein said solid support is an inorganic material selected from the group consisting of silica, alumina, titania, magnesium chloride, and mixtures thereof.

**Claim 32 (previously presented):** The catalytic system as recited in claim 28, further comprising a co-catalyst.

**Claim 33 (previously presented):** The catalytic system as recited in claim 32, wherein said co-catalyst is a methyl aluminoxane (MAO), a modified methyl aluminoxane (MAO), an alkyl aluminum compound, boron alkyl, or a metal salt of  $\text{BF}_4^-$ ,  $(\text{C}_6\text{F}_5)_4\text{B}^-$ , or  $(\text{R}_{40}\text{BAr}_3)^-$ .

**Claim 34 (withdrawn):** A process for polymerizing an olefin or a mixture of olefins or copolymerization in the presence of the catalytic system as recited in claim 32.

**Claim 35 (withdrawn):** The process as recited in claim 34, wherein said process is carried out at a pressure of 0.1 Mpa to 10 Mpa and a temperature of  $-50^\circ\text{C}$  to  $150^\circ\text{C}$ .

**Claim 36 (withdrawn):** The process as recited in claim 34, wherein said process is carried out at a catalyst : co-catalyst mole ratio of 1:1 to 1:5000.



**Claim 37 (withdrawn):** The process as recited in claim 36, wherein said process is carried out at a catalyst : co-catalyst mole ratio of 1:10 to 1:2000.

**Claim 38 (withdrawn):** The process as recited in claim 34, wherein said olefin or mixture of olefins is selected from the group consisting of ethylene, alkenes and functionalized alkenes containing 3 to 30 carbons, cycloalkenes, norbornene and derivatives thereof, dienes, acetylenes, styrene, alkenols, alkenoic acids and derivatives thereof, acrylic monomers, and mixtures thereof.

**Claim 39 (withdrawn):** The process as recited in claim 38, wherein said olefin is ethylene, propylene hexene, norbornene, or methyl methacrylate.

**Claim 40 (withdrawn):** The process as recited in claim 39, wherein said olefin is ethylene.